

TSMC00-079

ABSTRACT

A process for depositing, through plasma enhanced chemical vapor deposition, inorganic films having low dielectric constant is disclosed. After deposition under low power for a few seconds the power is raised to high for a few seconds, deposition of the film continuing to alternate between low and high power modes until the total desired thickness is reached. Additionally, for the deposition of materials such as black diamond, oxygen is added to the plasma during the high power phase (and removed during the low power phase). We have found that films deposited in this way have low flat band voltages, close to zero, and are, in general, more robust than films deposited according to prior art methods. In particular, these films are free of the cracking problems often encountered during chemical mechanical polishing of films of this type during the formation of damascene structures.